

FIRE PREVENTION STANDARDS

Subject LPG Storage and Dispensing Tanks **Number:** 435.203 **Date:** 8 Nov. 1995

I. Objective

Tanks and cylinders for the dispensing or storage of Liquefied Petroleum Gas located outside of buildings shall be in accordance with the following standard. This standard outlines the procedure to be followed and defines the requirements of the Sacramento Metropolitan Fire District, which may be more restrictive and not included in other codes or standards.

This standard is pursuant to Sacramento County Code 1135, Section 101.4; 1997 Uniform Fire Code Article 82; UFC Standard 82-1; N.F.P.A. Standard 58; Underwriters Laboratories, Inc. (UL); and the American Society of Mechanical Engineers (ASME).

II. Definitions:

- A. **LIQUEFIED PETROLEUM GAS:** is a material which is composed predominantly of the following hydrocarbons or mixtures of them: propane, propylene, butane, and butylenes.
- B. **LIQUEFIED PETROLEUM GAS EQUIPMENT:** is containers, apparatus, piping other than utility distributions piping systems, and equipment pertinent to the storage or handling of liquefied petroleum gas. Liquefied petroleum gas equipment does not include gas-consuming appliances.

III. Procedure

A. Permits:

- 1. A permit from the Fire District is required for any tank in excess 125 gallons water capacity. A separate plan review fee is required at the time of plan submission.
- 2. A separate permit for structural/electrical/mechanical may be required from the Sacramento County Building Department (875-5296).
- 3. If the tank is to be installed within the Rancho Murietta development, a copy of the approval letter from the Architectural Review Committee of the Association is required, including a copy of the Exclusive Use Easement if applicable.

B. Plans:

FIRE PREVENTION STANDARDS

Subject LPG Storage and Dispensing Tanks **Number:** 435.203 **Date:** 8 Nov. 1995

1. Submit two sets of plans with the information requested below. Plan size shall be a minimum of 18" x 24".
2. Capacity of tank.
3. Distances from tanks and dispensers to property lines, buildings, building openings, underground vaults, air vents, and overhead power lines. Plans shall clearly indicate the location of any existing adjacent tanks and dispensers in relation to the proposed installation.
3. Vehicle travel lanes.
4. Fire extinguishers (dispensing locations).
5. Vehicle impact protection.
6. Tanks and their supports.
7. Method of dispensing, if applicable.
8. Piping.
9. Electrical systems.
10. Emergency shut off controls. [NFPA 58, Section 3-9.3.10]
11. Tank enclosure, if applicable.
12. Any other relevant information.

C. LP-Gas Tanks

1. Tanks shall not exceed 2,000 gallons water capacity. [Exception: Agricultural Zone with special permit.]
2. Temporary LP-Gas tank installations.
 - a. Shall comply with this document if the tank will be used for more than 90 days. All tank installations shall be subject to items III-A and III-B.

FIRE PREVENTION STANDARDS

Subject LPG Storage and Dispensing Tanks **Number:** 435.203 **Date:** 8 Nov. 1995

- b. Temporary installations may use concrete skids for footings that will support the tank when installed on bare earth or asphalt.
 3. Out of service tanks or containers shall be removed from the site to a location approved by the chief. Tanks shall be considered out of service 30 days after their last use.
- D. Installation of Tanks
 1. Tanks used for service to a building only shall be installed in accordance with Table 3-2.2.2, UFC Standard 82-1.
 2. Tanks for dispensing shall be a minimum of 10 feet from any non-combustible building wall, public way, or other containers. [Table 4-3.3.2, UFC Standard 82-1]
 3. Tanks for dispensing shall be a minimum of 25 feet from any wall of a building that is other than fire resistive, building openings, adjoining property lines, or railroad centerline.
 4. If the tank is subject to vehicular traffic, guard posts shall be provided. These protection barricades shall consist of a six (6) foot length of six (6) inch steel pipe filled with concrete and set in concrete to a depth of three (3) feet in a twelve (12) inch diameter hole. Barricades shall be placed a minimum of three (3) feet from the device that they protect and a maximum of forty-eight (48) inches apart. Barricades shall never obstruct the operation of the device being protected.
 5. All tanks shall be secured to a 4" thick concrete pad with minimum 1/2" X 6" grade 8 bolts. Engineered seismic foundations will be accepted. Plans for such foundations will bear the wet stamp of the designing engineer. Exception: Underground tanks installed in accordance with Section 3-2.4.8, UFC Standard 82-1.
 6. If a structure is desired to hide an LP-Gas container, it is important to use materials that allow air to circulate freely. Examples of such materials are chain-link fence or materials that have significant openings on all sides. Wood can be used if constructed in a light fence. [Exception: mounded

FIRE PREVENTION STANDARDS

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aboveground LP-Gas containers installed in accordance with Section 3-2.4.7, UFC Standard 82-1]

7. **ALL** underground tanks and mounded aboveground tanks shall be provided with cathodic protection complying with UL 1746, *External Corrosion Protection Systems for Steel Underground Storage Tanks*, 1993.
8. Where necessary to prevent flotation due to possible high floodwaters around aboveground or mounded containers, or high water table for those underground, containers shall be securely anchored. The design of an anchorage shall be done by a registered civil engineer.
9. In accordance with CalOSHA regulations, containers shall be located within 100 feet of the vehicle access roadway from which filling will occur.

E. Safety

1. Signage required on tanks used for dispensing includes NFPA 704 placarding, "NO SMOKING WITHIN 15 FEET", and written procedures to follow when performing dispensing operations.
2. All weeds, grass, brush, trash, and other combustible material shall be kept not less than 10 feet from tanks. Exception: Light fences as described in D-6 above.
3. A minimum of one 40 BC fire extinguisher shall be provided at a location a minimum of 15' and a maximum of 30' from the tank. This requirement applies to dispensing locations.

F. LP-Gas Tanks and Cylinders at Retail/Wholesale Stores or Similar Occupancies.

1. Display racks outside shall be a minimum of 5 feet from electrical wiring, a minimum of 20 feet from building openings, and protected with barricades when near driveways.
2. Containers shall be located in a manner that minimizes exposure to excessive temperature, physical damage or tampering with valves. Tanks and cylinders stored outdoors

FIRE PREVENTION STANDARDS

Subject LPG Storage and Dispensing Tanks **Number:** 435.203 **Date:** 8 Nov. 1995

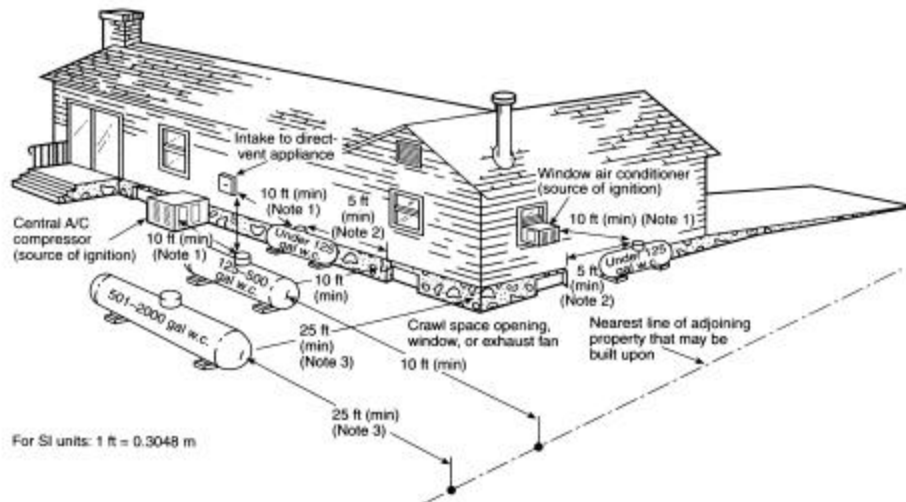
shall be secured to avoid being carried away in areas subject to flooding.

3. Fire Protection provisions noted in numbers E-2 and E-3 above also apply.
4. Cylinders
 - a. Individual cylinders shall not exceed 100 pounds (24 gallons) capacity. Cylinders and associated equipment shall comply with DOT specifications and UFC Standard 82-1, Section 3.
 - b. Maintain at least 20 feet separation between propane cylinders and heaters from other ignition sources and propane storage.
 - c. Position all heaters to minimize the ignition of combustibles.
 - d. Cylinders used inside buildings shall not exceed 60 pounds (14 gallons) capacity, shall be secured to prevent falling, and shall be equipped with excess flow valves sized for the BTU/hour demand and size of lines supplying the heater(s).
 - e. The number of cylinders shall not exceed the number of workers using the cylinders.
 - f. Cylinders shall not be left unattended. A night fire watch shall be provided for any installation intended for use during times when workers are not working, i.e. evenings and weekends.
 - g. Limit storage of cylinders outside of the building to 2,500 pounds (247.5 gallons) located at least 20 feet from any doorway frequented by the public.
 - h. Cylinder manifolds to each heater shall be limited to 300 pounds (71 gallons) of propane capacity, and cylinder manifolds supplying heaters on unpartitioned floors shall be separated by at least 20 feet.

Michael Dobson, Fire Marshal

FIRE PREVENTION STANDARDS

Subject LPG Storage and Dispensing Tanks Number: 435.203 Date: 8 Nov. 1995



Note 1: Regardless of its size, any ASME container filled on site must be located so that the filling connection and fixed maximum liquid level gauge are at least 10 ft from any external source of ignition (e.g., open flame, window A/C, compressor), intake to direct-vented gas appliance, or intake to a mechanical ventilation system. Refer to 3-2.2.2(d).

Note 2: Refer to 3-2.2.2(c)

Note 3: This distance may be reduced to no less than 10 ft for a single container of 1200 gal (4.5 m³) water capacity or less, provided such container is at least 25 ft from any other LP-Gas container of more than 125 gal (0.5 m³) water capacity. Refer to 3-2.2.2(e).

Figure I-2 Aboveground ASME containers.

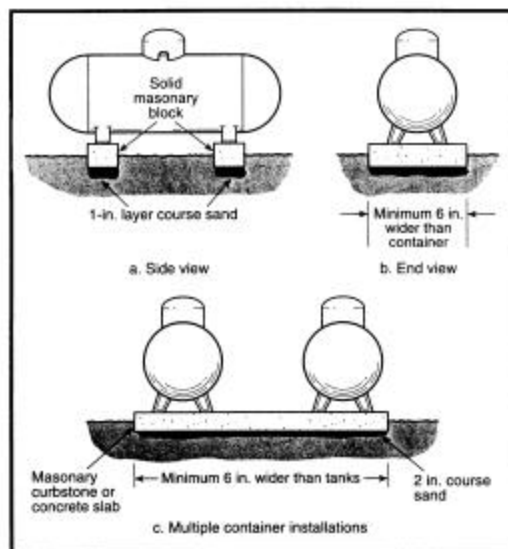


Figure 3.6 Typical smaller ASME container aboveground installation. (Courtesy of National Propane Gas Association.)

NOTE: If a structure is desired to hide an LP-Gas container, it is important to use materials that allow air to circulate freely. Examples of such materials are chain-link fence or materials that have significant openings on all sides. Wood can be used if constructed in a light fence.
EXCEPTION: mounded aboveground LP-Gas containers installed in accordance with Section 3-2.4.7, UFC Standard 82-1.

FIRE PREVENTION STANDARDS

Subject LPG Storage and Dispensing Tanks **Number:** 435.203 **Date:** 8 Nov. 1995

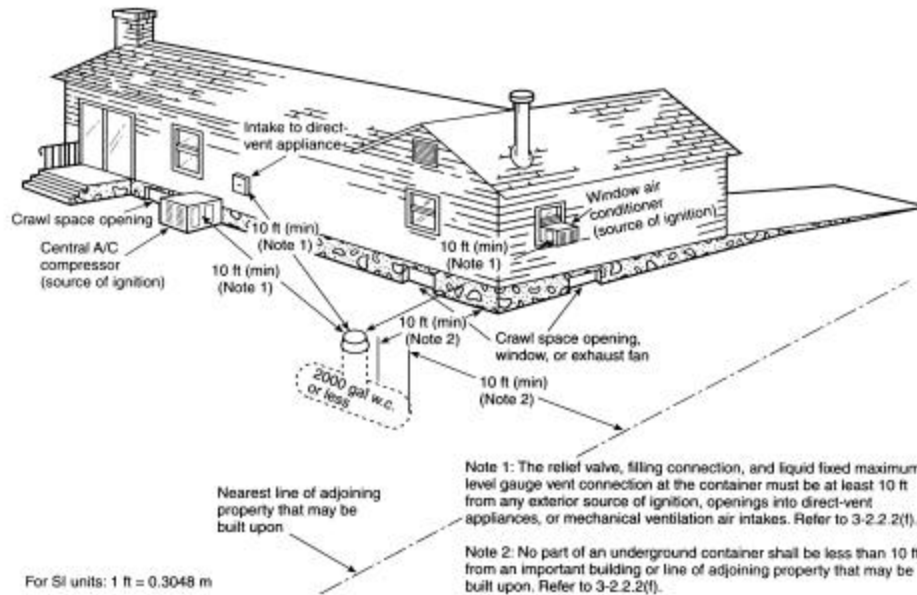


Figure I-3 Underground ASME containers.

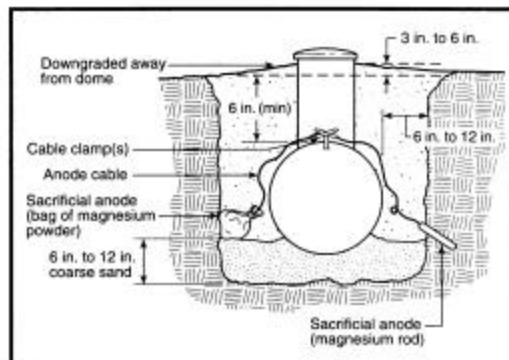
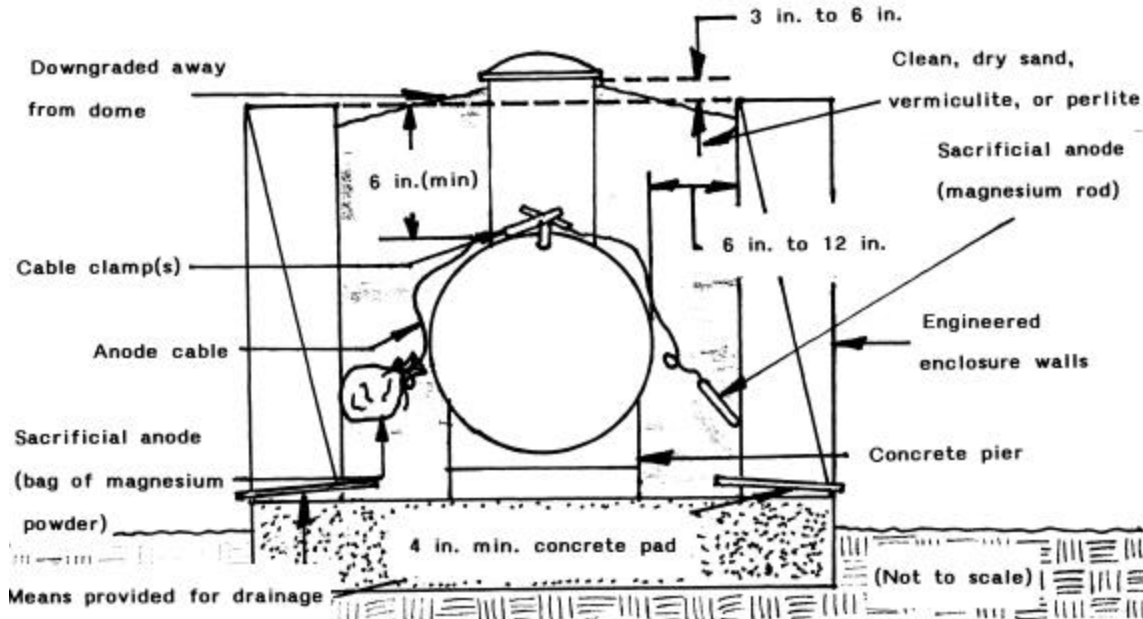


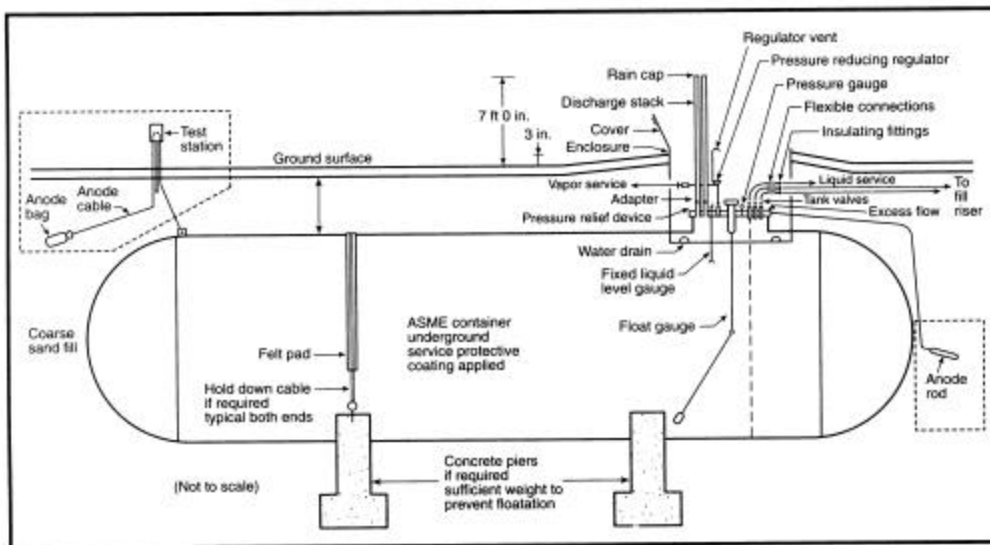
Figure 3.10 Typical small ASME container underground installation.

FIRE PREVENTION STANDARDS

Subject LPG Storage and Dispensing Tanks **Number:** 435.203 **Date:** 8 Nov. 1995



Typical small ASME container mounded in an enclosure.



Typical small ASME container underground installation.